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PATENT



SPECIFICATION

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PROVISIONAL SPECIFICATION.

**Improvements in Yielding Shaft Couplings for Conveying Rotary Motion.**

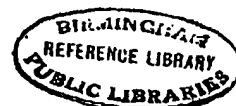
We, ARTHUR ISRAEL PARKES, of The Birmingham Corrugated Iron Company Limited, Ditton Road, Widnes, Lancashire, Director, and THOMAS MAINWARING, of The Birmingham Corrugated Iron Company Limited, Ditton Road, aforesaid, Fitter, do hereby declare the nature of this invention to be as follows:—

5 This invention has reference to yielding shaft couplings for conveying rotary motion and power our object being to provide an efficient yielding shaft coupling more particularly for use in the driving gear from an electric motor to the gearing through which a rolling mill is driven but which can be similarly used in other driving gear which is subjected to shocks through the  
10 work being put on suddenly as is the case in rolling mills, immediately the billet, bar, sheet or the like which is being rolled is gripped by the rolls.

According to this invention a yielding shaft coupling is constructed of two concentric ring or disc like half couplings arranged close together face to face and fixed on the ends of the driving and driven shafts respectively, each half  
15 coupling having lugs projecting from its periphery between which and the lugs of the other half coupling are introduced spiral or other springs or cushions in compression secured to said lugs by bolts or the like passing there-through and through the springs or cushions, the arrangement being such that the power and rotary motion are transmitted from the half coupling on the  
20 driving shaft through the springs or cushions to the half coupling on the driven shaft so that any shocks on the latter, as for instance by the work being put on suddenly, are absorbed by the springs or cushions with the result that the wear and tear on the driving gear and motor are considerably reduced.

The said lugs on the half couplings are shaped so as to project over the  
25 adjacent faces of the two half couplings which thus brings the centre bolts of the springs or cushions and lugs on the central plane of the coupling. There is a considerable amount of clearance in the holes in the lugs through which the bolts pass so as to allow the bolts to accommodate themselves to the altered positions of the lugs when the strain comes on the coupling, and in  
30 order to provide for the lateral movements of one or both ends of the spring or cushion on the face of the lugs, as the springs or cushions are compressed and the lugs come nearer together, steel or other bearing pads may be introduced between one or both ends of the spring or cushion and the lugs. The faces of the lugs against which the pads bear are preferably made of a hollow  
35 arc shape struck from the centre line at the other end of the spring or cushion. Any suitable construction of springs or cushions may be employed such for

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instance as helical steel springs of the kind used in buffers of railway and tramway vehicles, or the cushions may be composed of alternately arranged metal discs and thick vulcanized india-rubber washers threaded on to the bolts or the like which pass through the lugs.

When our invention is used in the driving gear of rolling mills in some cases it is preferred for each half coupling to be formed of a forged iron or steel ring having its lugs forged in a piece therewith and each ring made in halves and fitted and secured round a disc like member which is fixed on the shaft, or said rings are fixed to the shafts direct, the halves of the rings being fitted together by rebated or overlapped joints through which pass screws into the periphery of the disc so as to thus secure the half rings together and to the disc, in combination with other screws passing through the rings into the periphery of the disc. This construction is very convenient in case the lugs or half rings should break as they can readily be removed from the discs and renewed without having to renew the whole of the coupling.

The yielding coupling above described when used between a motor and worm gearing allows the motor free play as the coupling itself will give and take lateral motion without affecting either the gearing or the motor because the faces of the two halves of the coupling never actually touch and the said bolts which pass through the lugs and the spring or cushions have sufficient clearance to allow of the lateral play as aforesaid.

One particular advantage which is derived from employing the said yielding coupling when using a light fly wheel revolving at a high speed on the electric side of the gearing, instead of a slow speed heavy fly wheel running the same speed as the mill, is that the flexible coupling allows smaller and quicker speed motors and gearing to be used thus saving initial expense and also expenses in the running.

Dated this 2nd day of February, 1917.

CHARLES BOSWORTH KETLEY,  
Chartered Patent Agent,  
128, Colmore Row, Birmingham,  
Agent for the Applicants.

### COMPLETE SPECIFICATION.

#### Improvements in Yielding Shaft Couplings for Conveying Rotary Motion.

We, ARTHUR ISRAEL PARKES, of The Birmingham Corrugated Iron Company Limited, Ditton Road, Widnes, Lancashire, Director, and THOMAS MAINWARING, of The Birmingham Corrugated Iron Company Limited, Ditton Road, aforesaid, Fitter, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to yielding shaft couplings for conveying rotary motion and power our object being to provide an efficient yielding shaft coupling more particularly for use in the driving gear from an electric motor to the gearing through which a rolling mill is driven but which can be similarly used in other driving gear which is subjected to shocks or varying loads through the work being put on suddenly as is the case in rolling mills, immediately the billet, bar, sheet or the like which is being rolled is gripped by the rolls.

It has previously been proposed to construct a yielding shaft coupling of

two circular half couplings adapted to be fixed on the ends of the driving and driven shafts respectively each half coupling having within its periphery lugs between which and the lugs of the other half coupling there are springs or cushions in compression through which power is transmitted, said springs or cushions being secured between the lugs and the lugs connected together by bolts passing through the springs and lugs.

According to our invention a yielding shaft coupling is constructed of two disc like half couplings arranged close together face to face and fixed on the ends of the driving and driven shafts respectively, each half coupling having lugs projecting from its periphery between which and the lugs of the other half coupling are introduced a suitable number of spiral or other springs or cushions in compression secured to said lugs by bolts or the like passing therethrough and through the springs or cushions, the arrangement being such that the power and rotary motion are transmitted from the half couplings on the driving shaft through the springs or cushions to the half coupling on the driven shaft so that any shocks on the latter, as for instance by the work being put on suddenly, are absorbed by the springs or cushions with the result that the wear and tear on the driving gear and motor are considerably reduced. The number and strength of the springs or cushions employed as aforesaid has to be regulated by the power passing through the coupling. The said lugs on the half couplings are shaped so as to project over the adjacent faces of the two half couplings which thus brings the centre bolts of the springs or cushions and lugs on the central plane of the coupling.

Our invention is illustrated by the accompanying drawings of which:—  
Fig. 1 is a front elevation of a yielding shaft coupling constructed in accordance with this invention, the driving shaft on which one half coupling is mounted being shewn in cross section;

Fig. 2 is a part sectional plan of the same;

Fig. 3 is a front elevation of a modified form of the said half coupling adapted and fitted to an existing shaft coupling;

Fig. 4 is a sectional side elevation of the same taken on line X. X of Fig. 3 and shewing also the end portions of the driving and driven shafts on which the halves of the coupling are respectively fixed;

Fig. 5 is a plan of one half coupling of the arrangement shewn in Figs. 3 and 4;

Fig. 6 is a plan of the other half coupling of the same arrangement.

In the arrangement of our invention shewn by Figs. 1 and 2, the half couplings are respectively marked 1 and 2 and these are respectively fixed on the ends of the driving shaft A and the driven shaft B. The lugs for the centre bolts of the springs or cushions are formed in a piece with the respective half couplings, the lugs belonging to the half coupling 1 being in the example shewn four in number and marked 6 and the lugs belonging to the half coupling 2 being marked 7. These lugs project from the peripheries of the two half couplings which thus brings the centre bolts 8 of the springs or cushions and lugs on about the central plane of the coupling see Fig. 2. These bolts 8 pass through holes 9 in the lugs 7 and through the springs or cushions and through the holes 10 in the lugs 6. These holes and particularly those marked 10 are slotted or made with sufficient clearance to allow the bolts to accommodate themselves to the altered positions of the lugs when the extra strain comes on the coupling. Any suitable construction of springs or cushions may be employed between the lugs such for instance as cushion springs (Figs. 1 and 2) of the kinds used in the buffers of a railway or tramway vehicle, or helical springs (Figs. 3 and 4). The cushion springs shewn in Figs. 1 and 2 are composed of alternately arranged metal discs 11 and thick vulcanized indiarubber washers 12 all threaded on the bolts 8 or the like which pass through the lugs. In order to provide for the necessary lateral move-

ments of the bolts 8 and the ends of the springs or cushions on the faces of the lugs 6 as the lugs come nearer together and the springs or cushions are compressed. It is preferred to introduce a steel or other bearing pad between the end of the spring or cushion and the face 14 of the lug and these faces 14 are preferably hollowed as shewn for the bearing pads 13 to bear against and the face of the pad 13 is rounded to bear against the hollow surface 14 of the lug 6.

In the modification of our invention illustrated by Figs. 3—6 inclusive as applied to the halves 3, 4 of an existing flanged coupling, our half couplings 1, 2 are in this case for convenience of fixing made as rings in halves (shewn separated by Figs. 5 and 6) with the lugs 6, 7, projecting from their peripheries said half rings being fitted and secured as by screws 5 round the two half flange couplings 3, 4 which are respectively fixed on the ends of the driving shaft A and the driven shaft B. In this arrangement helical springs 15 are represented as used between the lugs, the larger ends of the springs being preferably arranged to fit in recesses 16 in the faces of the lugs 7 to prevent lateral displacement and the other or smaller ends of the springs engaging in recesses in the steel bearing pads 13 which as aforesaid bear against the hollowed faces of the lugs 6.

The yielding coupling above described when used between a motor and worm gearing allows the motor free play as the coupling itself will give and take lateral motion without affecting either the gearing or the motor because the faces of the two halves of the coupling are preferably arranged (see Figs. 2 and 4) so as to never actually touch and the said bolts which pass through the lugs and the springs or cushions have sufficient clearance to allow of the lateral play as aforesaid.

One particular advantage which is derived from employing the said yielding coupling in rolling mills when using a light fly wheel revolving at a high speed on the electric side of the gearing, instead of a slow speed heavy fly wheel running the same speed as the mill, is that the flexible coupling allows smaller and quicker speed motors and gearing to be used thus saving initial expense and also expenses in the running.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A yielding shaft coupling comprising in combination two disc-like half couplings arranged face to face and adapted to be fixed on the ends of the driving and driven shafts respectively, each half coupling having lugs projecting from its periphery between which and the lugs of the other half coupling there are springs or cushions in compression through which the power is transmitted, said springs or cushions being secured between the lugs and the lugs connected together by bolts passing through the springs and lugs, substantially as set forth.

2. A yielding shaft coupling constructed and adapted to act in the manner heretofore described and as illustrated by Figs. 1 and 2 of the accompanying drawings.

3. A yielding shaft coupling constructed and adapted to act in the manner hereinbefore described and as illustrated by Figs. 3 to 6 of the accompanying drawings.

Dated this 24th day of May, 1917.

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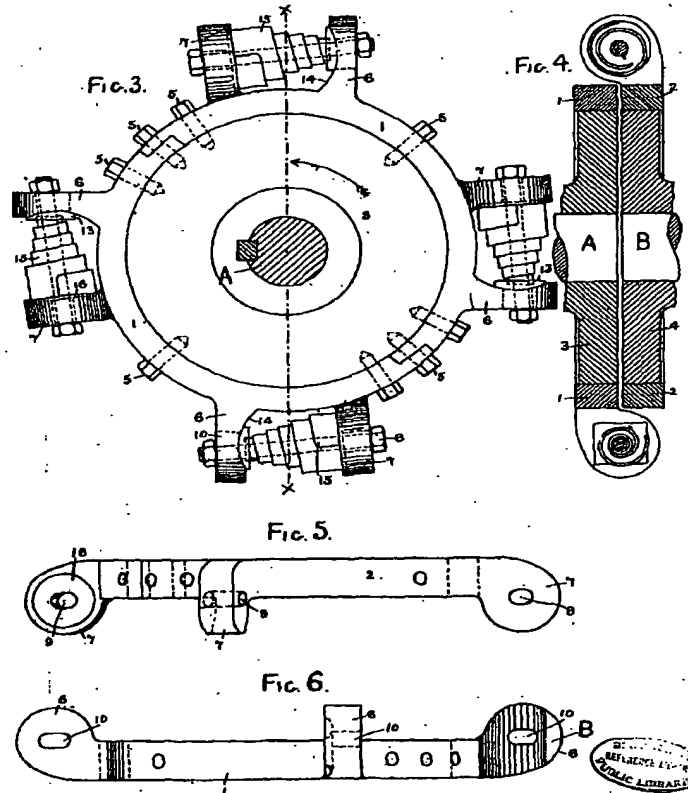
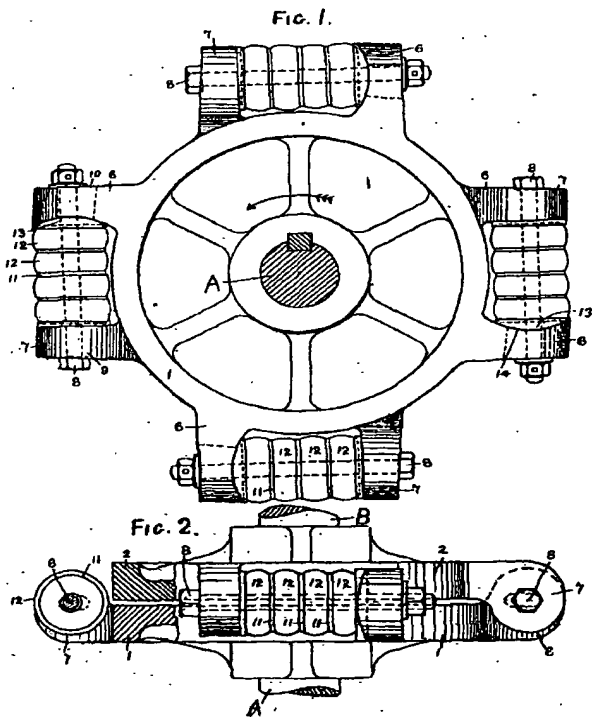


FIG. 1.

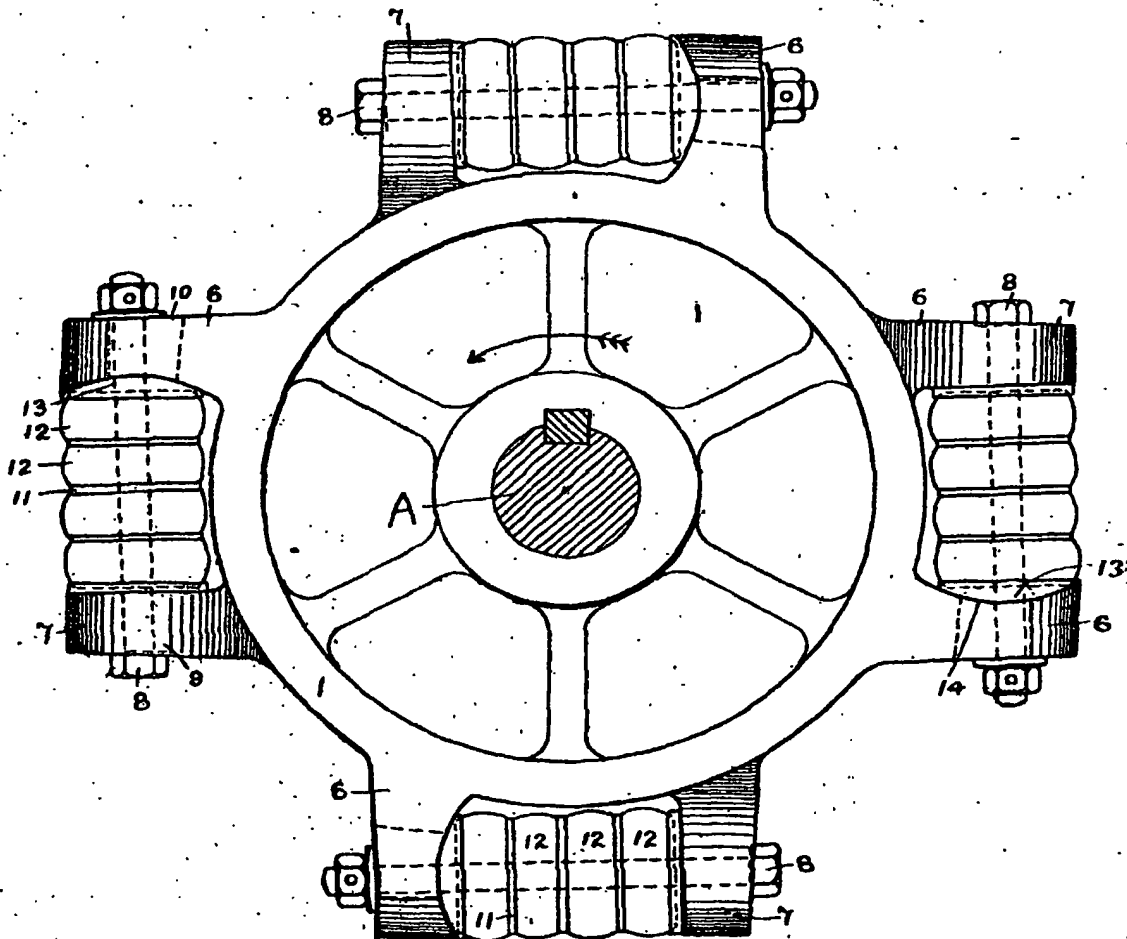
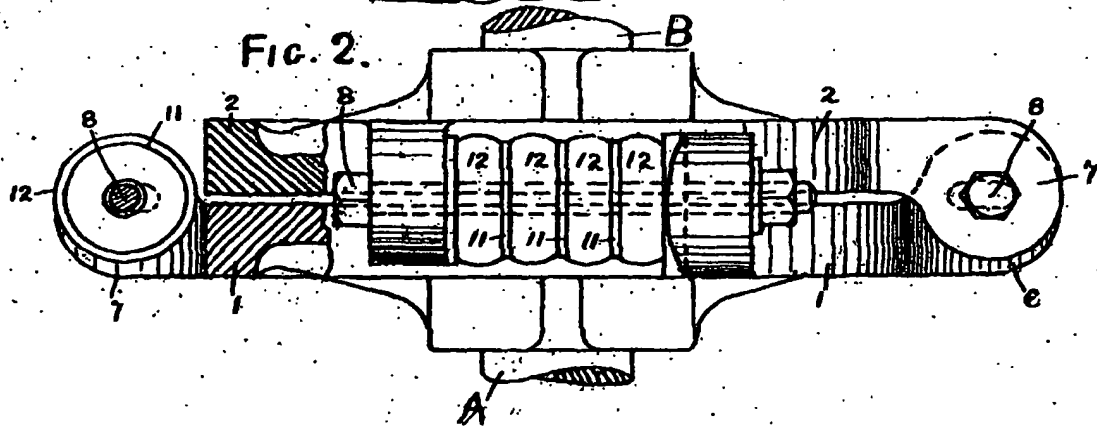
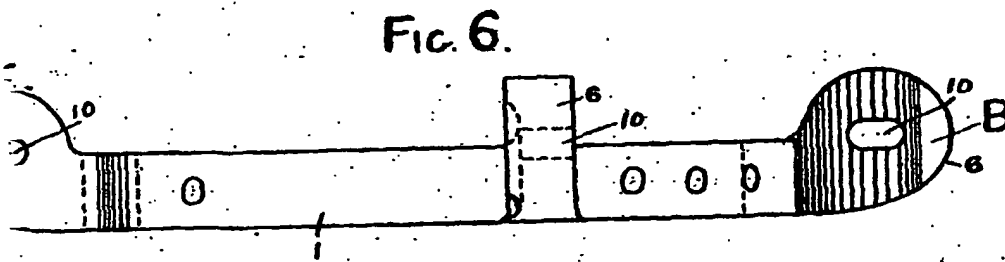
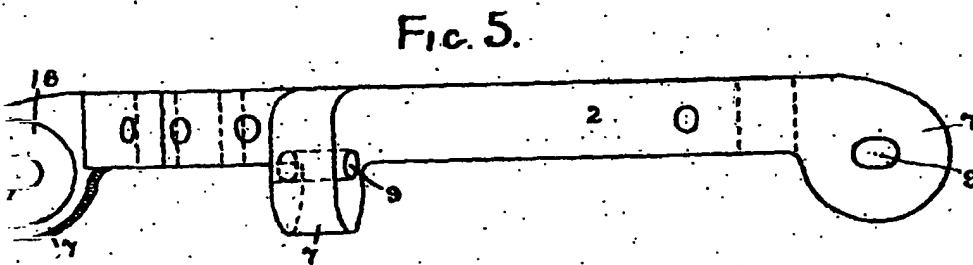
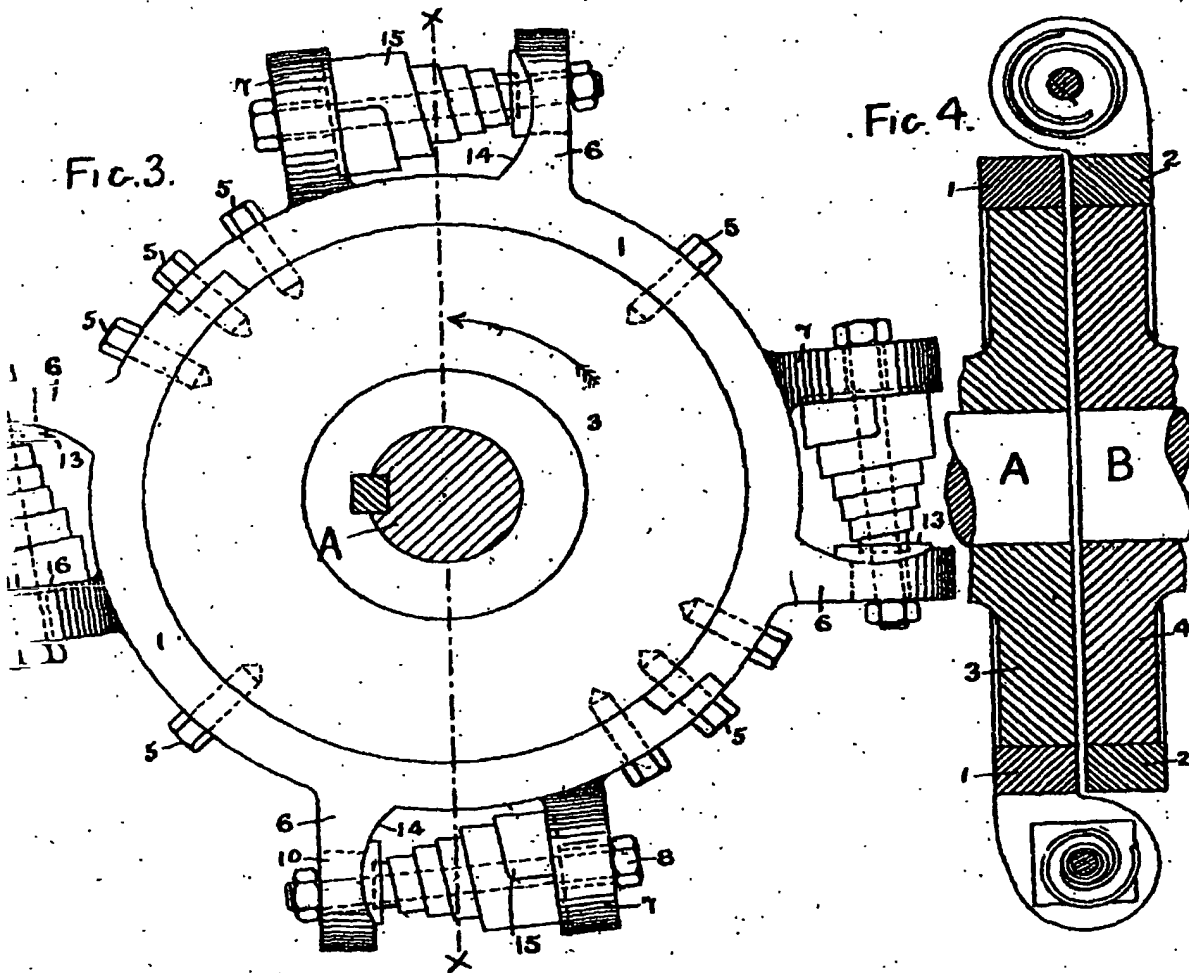


FIG. 2.



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